

Application no. 09/166,343
Amdt. dated August 18, 2004
Reply to Office Action of May 19, 2004

REMARKS / ARGUMENT

A. INTRODUCTION

In the office action dated May 19, 2004:

claims 22 and 24 were rejected under 35 U.S.C. § 102(e) over U.S. patent no. 6,128, 295 to Larsson *et al.* (hereafter "Larsson");

claims 13, 14, 16, 18-20, 25, 27, 30-32, 34-39, 41-43, 45-46 were rejected under 35 U.S.C. § 103(a) over U.S. patent no. 6,320,864 to Hebb *et al.* (hereafter "Hebb") in view of U.S. patent no. 5,978,359 to Caldara *et al.* (hereafter "Caldara");

claims 28 and 29 were found allowable; and

claims 23, 26, 27, 33, 40, and 44 were objected to, although allowable if written in independent form.

B. REJECTION UNDER 35 U.S.C. § 102(e)

Applicant submits that independent claim 22 of the present application is patently distinguishable with respect to Larsson because Larsson fails to disclose one or more features taught and claimed in the several embodiments of the present invention. Claim 22 recites:

In a switching device, a method for communicating data packets from sending ports to destination ports, the method comprising:
storing in a first stage queue **a pointer to memory** storing a data packet and a list of destination ports;
identifying a destination port stored in the first stage queue;
retrieving **the pointer to memory** stored in the first stage queue;
storing in a second stage queue associated with the identified destination port **the retrieved pointer to memory**; and

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using *the pointer to memory* in the second stage queue to complete the communication of the data packet from the sending port to the identified destination port.

As can be seen, "the pointer to memory" is an individual pointer that propagates through the multi-layer pointer buffer from the first stage queue to the second stage queue and is later used to transmit the data packet from the sending port. In some embodiments, the pointer to memory is a pointer to the data packet and is transmitted from the ingress buffers, through the switch fabric, to the egress buffer to facilitate the forwarding of data between the ingress and egress ports.

In contrast, Larsson discloses a *single-layer* pointer buffer, i.e., the queue area 114, that retains pointers to the cell memory 92 (col. 5, lines 35-42, and Fig. 3). Although Examiner has inferred that the box 124 of Fig. 3 is a "first stage queue" and the queue area 114 a "second stage queue" (office action, page 2, para. 2), the box 124 actually stores start pointers and stop pointers to the queue area 114. The start and stop pointers are used to determine the next available location in which to store an *address, i.e., a pointer*, to the cell memory 92. Thus, the start and stop pointers are a set of *pointers to pointers, not pointers to cells in memory* as claimed. See Fig. 13 and col. 9, lines 36-39:

"... if the cell is a CBR cell ... the stop cell queue pointer for queue 130C in set 124 would be incremented and utilized to discern the next location in queue 130C to which the address to the buffer 92 of the cell should be written."

Thus, the prior art fails to disclose or suggest the embodiment of the invention of claim 22.

C. REJECTION UNDER 35 U.S.C. § 103(a): CLAIM 13

Applicant submits that amended independent claim 13 of the present application is patently distinguishable with respect to the combination of Hebb and Caldara because the combination fails to disclose one or more features taught and claimed in the several embodiments of the present invention. Claim 13 recites:

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In a switching device, apparatus for communicating data packets from sending ports to destination ports, comprising:

a first stage queue comprising a plurality of first queues for storing packet-related data from a sending port, wherein the packet-related data is stored in the plurality of first queues based on a characteristic of the data packets;

a second stage queue associated with each of a set of destination ports, *the second stage queue comprising a plurality of second queues, each of the plurality of second queues for storing the packet-related data from each of the plurality of first queues of the first stage queue based on a characteristic of the data packets;* and

a switch fabric coupled to the second stage queue, the switch fabric using the packet-related data in the second stage queue for transmitting the data packets to a destination port.

As amended claim 13 provides, each of the plurality second stage queues is adapted to receive and store packet-related data from each of the plurality of first queues. As such, the switching device in this embodiment is adapted to organize packet-related data according to type of service (TOS), for example, at the first stage queue and then store the packet-related data at the second stage queue according to TOS and port.

In the combination of Hebb and Caldara, a subset of the upper level queues is operatively coupled to a subset of the lower level queues. That is, each of the output ports 14a-14n comprises a fractional number of the output queues 18 and only two output cell buffers A and B 20 (see Fig. 1). Not all of the output queues 18 among the plurality of output ports 14a-14n are operatively coupled to each of the cell buffers A and B 20 among the plurality of output ports

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14a-14n. Thus, the prior art does not disclose or suggest the embodiment of the invention of claim 13.

D. REJECTION UNDER 35 U.S.C. § 103(a): CLAIM 25

Applicant submits that independent claim 25 of the present application is patently distinguishable with respect to the combination of Hebb and Caldara because the combination fails to disclose one or more features taught and claimed in the several embodiments of the present invention. Claim 13 recites in relevant part: "storing in a first stage queue **a pointer** to memory storing a data packet and a **list of destination ports**."

In contrast to the claimed invention, the prior art disclose that *cells*, *not pointers*, are retained in the buffers. Hebb discloses: "Each output port 14a through 14n includes a plurality of output queues 18 for storing *cells* in advance of dispatch from the respective output port 14" (emphasis added) (col. 4, lines 15-18). Caldara discloses: "*Cells* enter the switch through the input port and are buffered in the input buffers. The *cells* are then transmitted from the input buffers to the output buffers, and then transmitted to the output port" (emphasis added) (col. 1, lines 42-45).

In addition to pointers, Applicant is unaware of any teaching in the prior art of a "list of destination ports," as is claimed. Claim 25 is therefore allowable.

E. REJECTION UNDER 35 U.S.C. § 103(a): CLAIMS 30 AND 39

Applicant submits that independent claims 30 and 39 are patently distinguishable with respect to the combination of Hebb and Caldara because the combination fails to disclose one or more features taught and claimed in the several embodiments of the present invention. Claim 30 recites in relevant part:

transmitting the data packets in the second stage queue to a switch fabric for completing the communication of the data packet from the sending port to each determined destination port.

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The switch fabric is thus downstream of both the first stage queue and second stage queue. Thus, the combination of first stage queue and second stage queue provide what may be called an ingress-buffered switch.

In contrast to the present invention, Caldara discloses that the switch fabric is *interposed between* the plurality of input buffers 26 and plurality of output buffers 28 (Fig. 2 and col. 4, lines 29-32). Applicant is unaware of any suggestion in the prior art to modify Caldara to interpose the second stage queue between the first stage queue and the switch fabric.

Like claim 30, the embodiment of the invention of claim 39 recites that the second stage queue transmits data to the switch fabric. Thus, the present invention in claims 30 and 39 are novel and non-obvious.

F. REJECTION UNDER 35 U.S.C. § 103(a): CLAIMS 31 AND 36

Applicant submits that independent claims 31 and 36 are patently distinguishable with respect to the combination of Hebb and Caldara because the combination fails to disclose one or more features taught and claimed in the several embodiments of the present invention. Claim 31 recites in relevant part:

... a plurality of first queues for storing packet-related data associated with the data packets based on a **first characteristic of the data packets**; and
... a plurality of second queues for storing the packet-related data based on the **first characteristic** and a second characteristic.

As can be seen, the second queues store the packet related data based on the same first characteristic as the first queues, thereby taking advantage of the pre-sorting performed by the first queues. In the one preferred embodiment of the invention, the first queues and second

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queues both store packet-related data according the packet's type of service determined at ingress.

In contrast to the present invention, the Hebb discloses four (4) or more output queues 18 and only two (2) output cell buffers A and B 20 per output port 14a-14n. Clearly, there is no suggestion that the output queues 18 and the output cell buffers 20 *both* store data in accordance with the *same first characteristic of the data packet*. In fact, the output cell buffers 20 *cannot* store data based upon the same characteristic as the output queues 18 because that would require that there be at least as many output cell buffers 20 as there are output queues 18. Since there are less output cell buffers 20 than there are output queues 18, they cannot both store data based on a first characteristic.

Like claim 31, the embodiment of the invention of claim 36 recites that the first queue structure and second queue structure both store data in accordance with a first characteristic. Thus, claim 31 and 36 are novel and non-obvious.

G. REJECTION UNDER 35 U.S.C. § 103(a): CLAIM 34

Applicant submits that independent claim 34 is patently distinguishable with respect to the combination of Hebb and Caldara because the combination fails to disclose one or more features taught and claimed in the several embodiments of the present invention. Claim 35 recites that the plurality of first queues and plurality of second queues *both* store data based on the packet's type of service. In contrast, Hebb discloses that cells are stored according to priority at only one stage, not both stages. In particular, Hebb discloses that cells are stored in the priority queues 100a-100d according priority while the cells stored in output cell buffers A/B 102/104 are not stored according to priority, as is evidenced by the different number of queues at the two levels (Fig. 3 and col. 5, lines 22-53. Accordingly, Applicant respectfully asserts claim 34 is novel and non-obvious.

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H. REJECTION UNDER 35 U.S.C. § 103(a): CLAIMS 14, 16, 24, 38, 18-20, 27, 34-35, 37, 41-43, 45-46

The claims 14, 16, 38, 18-20, 24, 27, 34-35, 37, 41-43, 45-46 depend from independent claims that are patently distinguishable from prior art and are therefore allowable.

I. CONCLUSION

For all the forgoing reasons, Applicant submits that the present invention is patently distinguishable from Larsson, Hebb and Caldara either alone or in combination. Accordingly, Applicant respectfully requests that a timely Notice of Allowance be issued in this case.

Pursuant to 35 U.S.C. 132 and 37 CFR 1.121, Applicant has exercised care to avoid the introduction of new matter. Should there be any fees for this action, your office is authorized to draw from the firm deposit account number 02-3979. Should you have any questions, or identify any problem, I would appreciate a telephone call so that this matter may be resolved promptly.

Respectfully submitted,

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